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Range extension of *Hypostomus cochliodon* Kner, 1854 (Siluriformes: Loricariidae) in Bermejo River, Salta, Argentina

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Abstract: *Hypostomus cochliodon* Kner, 1854 had been recorded from Paraguay and Paraná rivers in Argentina. We recorded for the first time specimens of *H. cochliodon* to the Bermejo River basin. It is also the first record of this species to Salta province, Argentina.

Key words: biogeography; distribution; northwestern Argentina; first record; Hypostominae

The Loricariidae include over 900 species in 70 genera, being the most diverse family within Siluriformes (Eschmeyer and Fong 2015). This family includes species with the body covered by bony plates and showing a great diversity of size, from the smallest *Nannoplecostomus eleonorae* Ribeiro, Lima & Pereira, 2012 (about 9 mm SL) to the largest forms, such as the ancistrine *Pseudacanthicus histrix* (Valenciennes, 1840) (reaching 900 mm SL).

Within Loricariidae, Hypostominae is the most species-rich subfamily and the most geographically widespread (Eschmeyer and Fong 2015). Armbruster (2004), after a phylogenetic analysis of the Hypostominae, considered *Cochliodon* Heckel, 1854 as synonym of *Hypostomus* Lacépède, 1803.

Hypostomus is one of the most diverse loricariid genera, including about 130 valid species (Eschmeyer et al. 2015). This genus has a wide distribution in the Neotropical basins, occurring from Central America to La Plata River in Argentina.

Species of the *Hypostomus cochliodon* group, along with *Panaque* Eigenmann & Eigenmann, 1889, are distinctive among fishes by feeding on wood as the major part of the diet (Schaefer and Stewart 1993; Armbruster 2003). Those species share the presence of large spoon-shaped teeth, which was independently acquired in *Panaque* and the *H. cochliodon* group, according to the hypothesis of Armbruster (2004).

Currently, 20 valid nominal species are included in the *H. cochliodon* group (Armbruster 2003; Tencatt et al. 2014). In Argentina, this group is represented only by *Hypostomus cochliodon* Kner, 1854, which was described from the Cuiabá River basin, Brazil (Kner 1854: 265) but can be found along the Paraguay and Paraná rivers (Armbruster 2003; Weber 2003; Zawadzki et al. 2005; Graça and Pavanelli 2007; Tencatt et al. 2014; Almirón et al. 2015).

The Bermejo River is one of the most important hydrographic systems of Argentina and one of the most important tributaries of the Río de la Plata system. A recent collecting expedition to northwestern Argentina allowed us to record *Hypostomus cochliodon* from the upper Bermejo River basin (Figure 1).

Morphometric measurements were taken following Tencatt et al. (2014); they were taken with a caliper to nearest 0.01 mm, are straight lines between two points, and expressed as percentage of standard length (SL) and head length (HL).

Specimens herein reported were collected after intense fieldwork in the upper Bermejo River basin, done under permit (Number 335/15 and 594/15, issued by Secretaría de Ambiente of Salta province). Specimens were captured using hand nets. Voucher specimens were euthanized by an overdose in benzocaine solution, fixed in 4% formalin solution for 7 days and preserved in 70% ethanol.

Institutional abbreviation: CI-FML. Ichthyological collection of Fundación Miguel Lillo.

Examined material. CI-FML 7091, 10 specimens, 55.2–230.0 mm SL, Argentina, Salta, Bermejo River basin, 23°10′56″ S, 064°12′18.36″ W, September 2015, Mirande, Aguilera, Alonso, and Terán. CI-FML 7092, 1 specimen, 75.8 mm SL, Argentina, Salta, San Ramón de la Nueva Orán, Aguas Lindas stream, Bermejo River basin, 23°00′53″ S, 064°21′54″ W, September 2015, Mirande, Aguilera, Alonso, and Terán. CI-FML 7093, 2 specimens, 51.4–100.8 mm SL, Argentina, Salta, San Ramón de la Nueva Orán, unnamed stream between Pescado and Blanco River, Bermejo River basin, 23°01′33″ S,

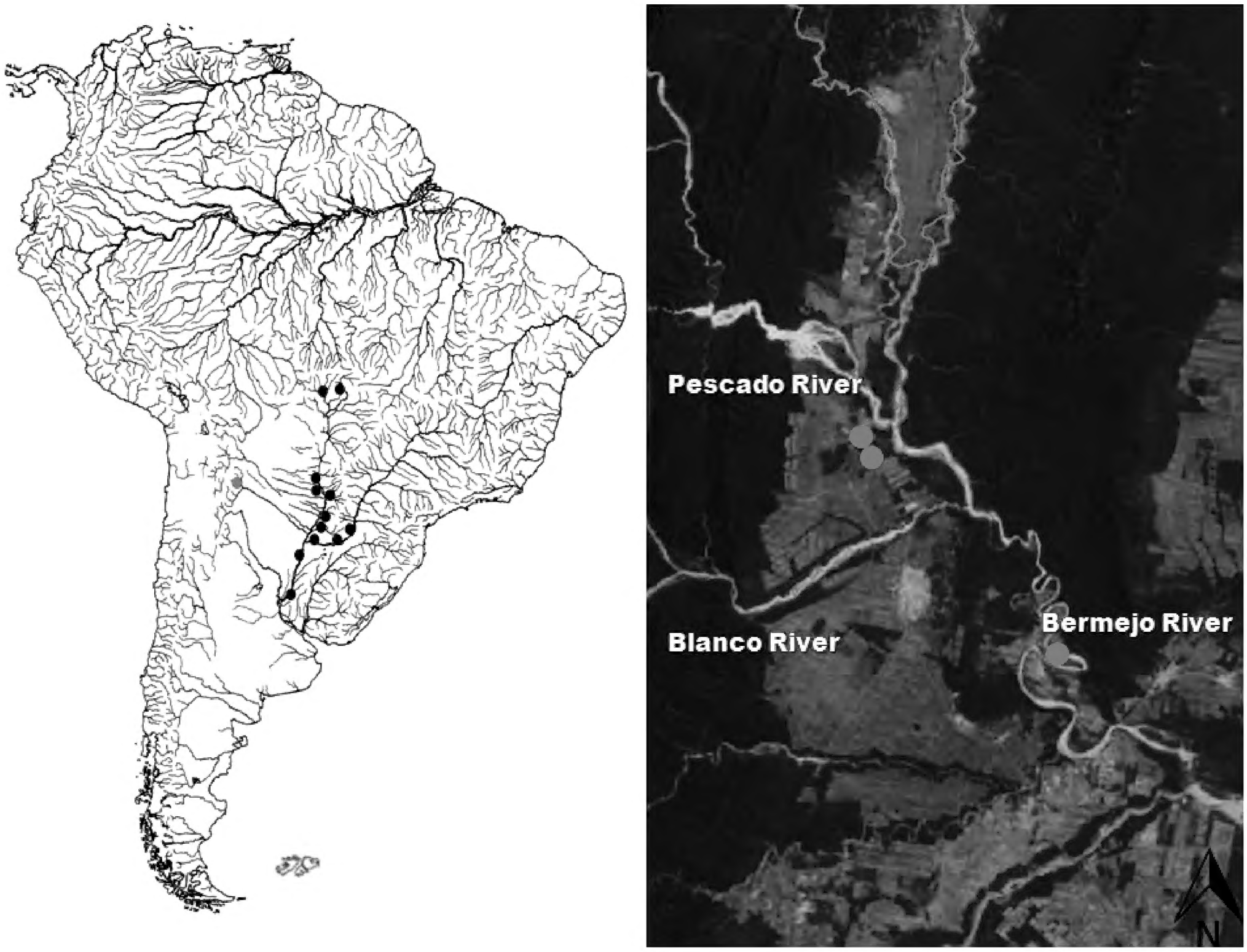

Figure 1. Sites of *Hypostomus cochliodon* in Bermejo River basin, Salta province, Argentina.

064°21′37″ W, May 2015, Mirande, Alonso and Terán. CI-FML 7150, 2 specimens, 49.3 and 293.0 mm, Argentina, Salta, Embarcación, Bermejo River, 23°14′54″ S, 064°08′15″ W, August 2003, Mirande and Aguilera.

According to Tencatt et al. (2014), *Hypostomus cochliodon* can be distinguished from the other species of the *H. cochliodon* group by the following characters: 1) opercle almost completely covered by a thick layer of skin and exposed region not easily visible; 2) absence of buccal papillae; 3) presence of weak to moderately developed keels on lateral plates; 4) presence of small dark spots closely-set on head and larger, widely spaced spots on trunk, with caudal peduncle generally without spots; 5) caudal-fin lobes evenly colored; 6) bicuspid teeth with a large spoon-shaped mesial cusp and inconspicuous lateral cusp that is generally fused to mesial cusp; 7) absence of a longitudinal dark stripe along midline of flank; and 8) presence of an adipose fin. All these characters are shared by the specimens collected at the Bermejo River basin (Figures 2–4), allowing us to identify them as *H. cochliodon.*

As it was reported by Tencatt et al. (2014), the coloration pattern is highly variable in this species with some individuals more spotted than others. Such variation was also found in the specimens from the Bermejo River basin.

The coloration in life of one of the collected specimens showed a stress color pattern (Figure 4) in which the individual is very dark with black stripes dorsally. This is frequently observed in life (Tencatt pers. com.), but this coloration is lost after fixation. Color changes may be important for communication and intra- or interspecific signaling in Loricariidae, and it would be interesting to investigate its relationship with reproduction, physiology and agonistic behaviors.

Morphometric measurements of *H. cochliodon* from the Bermejo River basin are provided in Table 1.

After an intensive sampling performed at northwestern Argentina in the Bermejo River basin, the main western tributary to the Paraguay–Paraná system, we collected specimens identified as *Hypostomus cochliodon*, according to the diagnosis provided by Tencatt et al. (2014). Those new records for this basin considerably extend the known distribution range of this species and also represent the first record for *H. cochliodon* in the Yungas province (*sensu* Morrone 2014) and the highest

altitude (350 m above sea level) recorded for this species, in addition to the first record for Salta province.

The upper Bermejo River basin has rocky bottoms and moderately fast to fast-flowing waters that run from west to east through the Andes to the chacoan plain. Rains are mainly concentrated in summer and most rivers in the area have a highly torrential regime during that period with high amounts of suspended particles and turbidity, while the volume of water is considerably diminished during the rest of the year

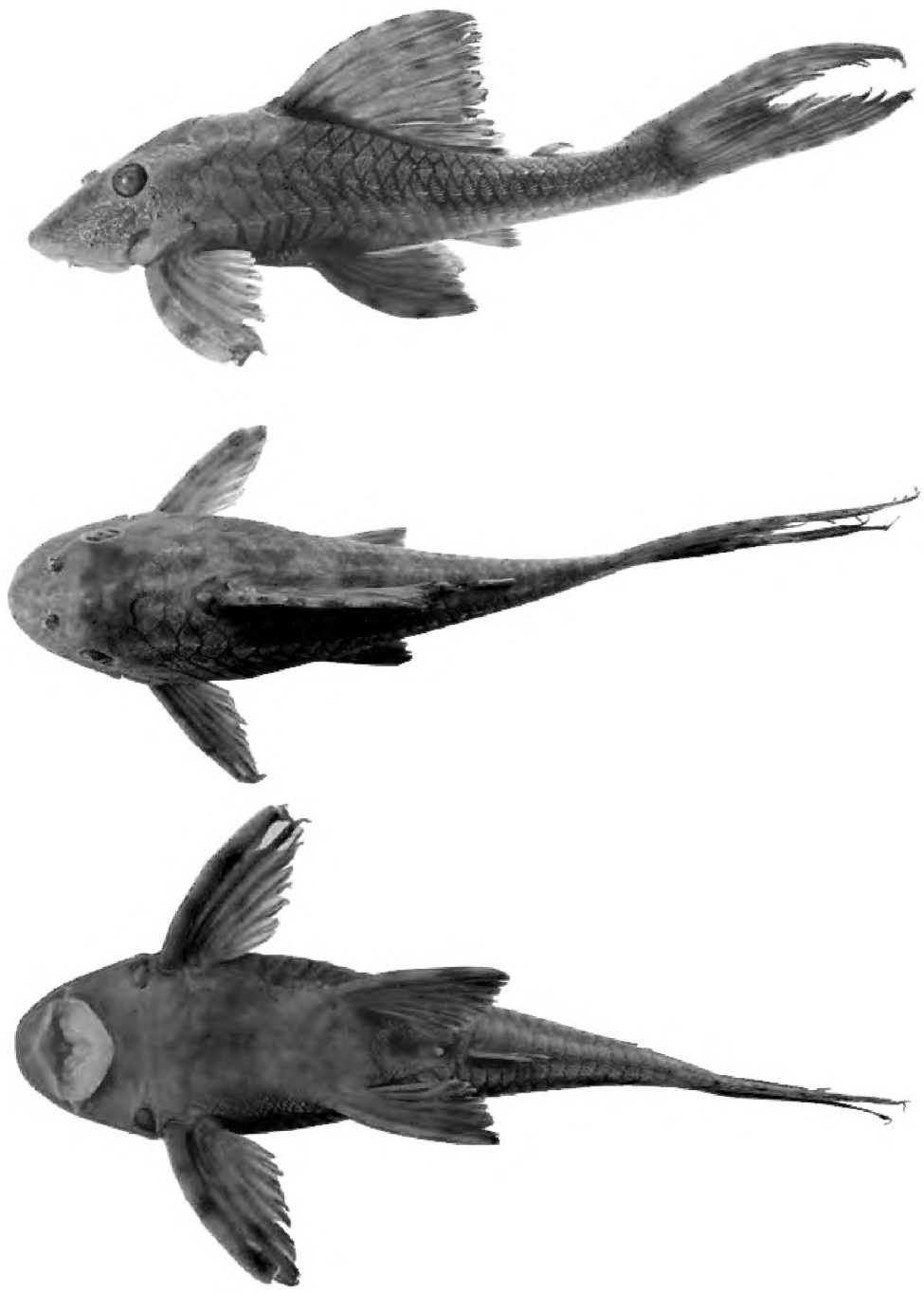

Figure 2. *Hypostomus cochliodon*, CI-FML 7091, 86.1 mm SL, Bermejo River, Salta province, Argentina; lateral, dorsal, and ventral views.

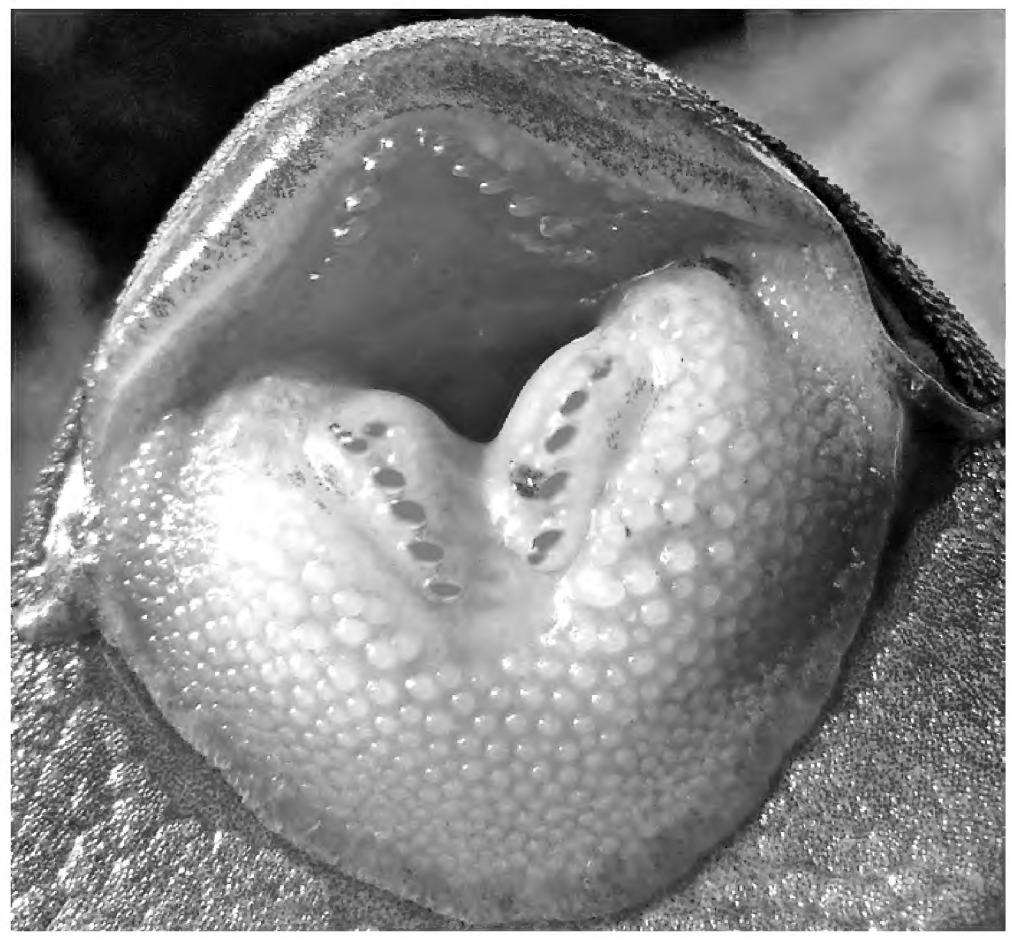

Figure 3. *Hypostomus cochliodon*, CI-FML 7093, 100.8 mm SL, live specimen, Bermejo River, Salta province, Argentina. Teeth in detail.

Figure 4. *Hypostomus cochliodon*, CI-FML 7093, 100.8 mm SL, live specimen, Bermejo River basin, Salta province, Argentina.

Table 1. Morphometric measurements of *Hypostomus cochliodon,* CI-FML 7091-7093, from Bermejo River basin, Salta, Argentina (*n* = 13). SD = standard deviation.

	Range	Mean	SD
Standard length (mm)	51.5–230.0	88.5	47.5
Percentage of standard length			
Predorsal length	37.3–45.4	42.5	2.0
Head length	29.3–38.7	35.0	2.9
Interdorsal distance	15.1–18.5	16.8	1.1
Thoracic width	21.4–23.9	22.5	0.7
Abdominal width	19.7–21.8	20.7	0.6
Caudal peduncle length	24.2–34.9	31.8	2.6
Caudal peduncle depth	8.7–10.3	9.2	0.4
Dorsal-fin spine length	20.7–36.7	32.6	4.3
Dorsal-fin base length	23.0–29.2	25.9	1.9
Pectoral-fin spine length	26.8–32.0	29.2	1.5
Pelvic-fin spine length	23.5–26.7	25.1	1.0
Upper caudal-fin ray length	32.5–49.5	42.9	5.1
Lower caudal-fin ray length	30.6–51.2	46.3	6.1
Adipose-fin spine length	6.1–8.8	7.1	0.8
Cleithral width	28.1–31.1	29.8	0.9
Percentage of head length			
Head depth	55.5–77.0	61.0	6.2
Snout length	58.3–73.7	62.7	3.7
Interorbital width	43.8–55.6	48.4	2.8
Orbital diameter	12.2–19.1	16.5	1.8
Lower lip width	39.0–49.3	43.2	2.7
Lower lip length	11.4–17.9	14.9	1.6
Maxillary barbel length	8.0–12.3	9.5	1.3

when water is very clear and transparent. Most streams in the upper Bermejo River basin, in the lower portion of the Yungas, where *H. cochliodon* was collected, have abundant marginal vegetation and rocky bottoms. When the Bermejo River reaches the chaco-pampean plain, near the city of Embarcación in Salta, a sudden ecological change is observed; the bottom is muddy, driftwood is abundant and the water is turbid, with a great amount of solids in suspension the whole year, although in the dry season water is less turbid (Alonso and Terán pers. obs.). This great ecological change may represent a geographic barrier for many species, which is reflected in the high levels of endemism observed in the Yungas area (e.g., Casciotta and Almirón 2004; Mirande et al. 2004a, 2004b, 2006, 2011; Rodríguez and Miquelarena 2005; Miquelarena and Menni 2005; Calviño and Alonso 2009). Nevertheless, many species are shared between the upper Bermejo River basin and the remaining Paraná–Paraguay basins such as the case of *H. cochliodon* or, for example, *Astyanax lacustris*, *A. lineatus*, and *Cichlasoma dimerus*, among many others, reported by Gonzo (2003), Mirande and Aguilera (2009), and Aguilera et al. (2016).

This new record highlights the importance of biodiversity survey projects in poorly know ecosystems and should be taken into account for conservation and resource extraction in the basin.

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